

REMARKS

Favorable reconsideration of this application in light of the preceding amendments and the following remarks is respectfully requested.

No claims having been cancelled or added, the Applicants respectfully submit that claims 1-40 remain properly under consideration in this application.

The Applicants note with appreciation the Examiner's acknowledgement that certified copies of all priority documents have been received by the USPTO. Action Summary at 12.

The Applicants note that the present Action does not indicate that the drawings have been accepted by the Examiner. The Applicants request that the Examiner's next communication include an indication as to the acceptability of the filed drawings or as to any perceived deficiencies so that the Applicants may have a full and fair opportunity to submit appropriate amendments and/or corrections to the drawings.

Specification

With regard to the suggestion that Applicants' incorporation by reference is improper, the Applicants note that each of the incorporated applications are those from which the present application claims priority. The Applicants note that 37 C.F.R. § 1.57(a) provides that:

(a) Subject to the conditions and requirements of this paragraph, if all or a portion of the specification or drawing(s) is inadvertently omitted from an application, but ***the application contains a claim under § 1.55 for priority of a prior-filed foreign application, or a claim under § 1.78 for the benefit of a prior-filed provisional, nonprovisional, or international application***, that was present on the filing date of the application, and the inadvertently omitted portion of the specification or drawing(s) is completely contained in the prior-filed application, the claim under § 1.55 or § 1.78 ***shall also be considered an incorporation by reference of the prior-filed application as to the inadvertently omitted portion of the specification or drawing(s).***

37 C.F.R. § 1.37(a) (emphasis added). The Applicants submit that because the only materials incorporated by reference in paragraph [0001] are those from which the present application claims priority, the explicit incorporation by reference merely reflects the effect of the applicable rule. According, unless the Examiner indicates what “essential material” is deemed missing from the disclosure, the Applicants contend that no amendment of the present disclosure is warranted.

The disclosure was also objected to for certain typographical errors, Action at 2, which have been addressed by the amendments to the specification, specifically paragraphs [0038], [0041] and [0042], reflected above. The Applicants submit that these amendments are sufficient to overcome each of the objections and request that they be reconsidered and withdrawn accordingly.

Claim Objections

Claims 10, 11, 21, 22 and 34-36 stand objected to for various minor informalities as detailed in the Action. Action at 2. The Applicants respectfully submit that the amendments to the claims reflected above are sufficient to address and overcome each of the identified informalities. The Applicants note, however, that the use of a period “.” in the temperature unit abbreviation “° C.” is widely accepted as evidenced by such usage in the references subsequently cited by the Examiner in support of the rejections under 35 U.S.C. § 103(a). The Applicants contend, therefore, that these corrections are stylistic only and do not constitute any change in the scope of the affected claims. The Applicants respectfully request, therefore, that these objections be reconsidered and withdrawn accordingly.

Rejections under 35 U.S.C. § 112

Claims 1-40 stand rejected under 35 U.S.C. § 112, second paragraph, as indefinite, specifically with respect to the terms “silicon surfaces” and “silicide blocking layer” in claims 1, 12 and 23.

The Applicants note that claims need provide only a reasonable degree of particularity and distinctness and are to be interpreted as a whole to determine whether the claim adequately apprises one of ordinary skill in the art of the scope of the claimed invention. MPEP § 2173.02. The Applicants contend that one of ordinary skill in the art considering claims 1, 12 and 23 in light of the specification and figures of the present invention would have no difficulty appreciating that 1) in order to serve its function the

silicide blocking layer must be formed on the substrate and 2) the referenced silicon surfaces are those portions of the substrate upon which the silicide layers are to be formed. The Applicants contend, therefore, that one of ordinary skill, considering the entire claim in light of the specification would have no difficulty appreciating the metes and bounds of the methods recited in the independent claims.

The Applicants also note that the claims are entitled to some latitude in the manner of expression even if the claim language is not as precise as the examiner might desire. Accordingly, the Applicants submit that the amendments to the claims reflected above merely make explicit the understanding of the original claims by one of ordinary skill in the art and do not, therefore, constitute narrowing amendments. Indeed, the Applicants contend that the present amendments do not present any new issues or recast the claims in a fashion in any way inconsistent with the interpretation clearly used in formulating the subsequent prior art rejections. Accordingly, the Applicants contend that these amendments require only cursory consideration and do not necessitate a new search.

The Applicants submit that the amendments to the claims reflected above are sufficient to address and overcome the alleged indefiniteness by making explicit the understanding of one of ordinary skill in the art. The Applicants respectfully request, therefore, that these rejections be reconsidered and withdrawn accordingly.

Rejections under 35 U.S.C. § 103

Claims 1, 23, 24, 28 and 29 stand rejected under 35 U.S.C. § 103(a) as unpatentable over En et al.'s U.S. Patent No. 6,518,631 ("En") in view of Aloni's U.S. Patent No. 6,458,702 ("Aloni"). Action at 3. The Applicants traverse this rejection for the reasons detailed below.

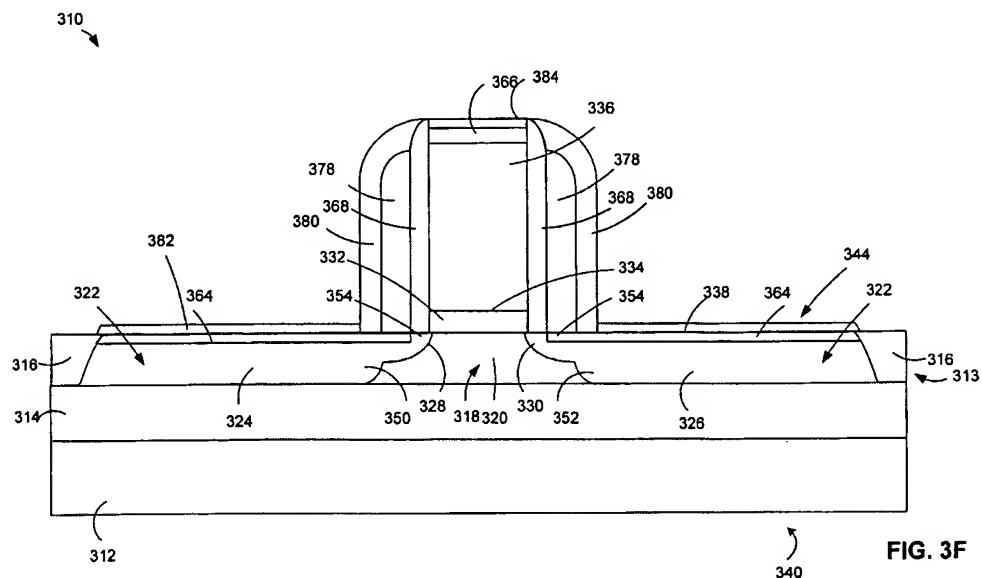
The Applicants note that the rejected claims require that the recited steps be performed "in order." The Applicants further note that En forms silicide regions 364 in step **218** using a temperature between 200 °C and 700 °C, En, col. 5, line 66 to col. 6, line 21, and implants the source/drain regions in step **222**, *Id.*, col. 6, lines 38-49, and anneals the semiconductor device 310 at, for example 1020-1050 °C, ***after implantation***, *Id.*, col. 6, lines 64-67. Thus, while En discloses an activation anneal, this higher temperature anneal only occurs ***after*** silicide regions have been formed at a ***lower*** silicidation temperature.

The Applicants submit, therefore, that En does not teach or suggest the sequence of steps recited in claims 1 and 23, and, indeed, teaches away from annealing the substrate to activate the dopant (or even implanting the S/D dopant) before forming silicide on the exposed silicon surfaces.

The Applicants further submit that Aloni does not remedy the noted deficiencies of En and that, therefore, the proposed combination fails to teach or suggest the recited method to one of ordinary skill. The Applicants, therefore, contend that the proposed combination is an insufficient basis on which to maintain a rejection under 35 U.S.C. § 103(a) and request that it be reconsidered and withdrawn accordingly.

Claims 25-27 stand rejected under 35 U.S.C. § 103(a) as unpatentable over En in view of Aloni and further in view of the selection provided from Wolf’s “Silicon Processing for the VLSI Era” (“Wolf”). Action at 5. The Applicants traverse this rejection for the reasons detailed below.

The Applicants incorporate by reference the discussion above regarding the deficiencies of the proposed combination of En and Aloni for teaching the method as recited in claim 23 from which claims 25-27 depend. The Applicants also note that as illustrated in En's FIG. 3F and described in the cited text, Action at 5, the subsequent layers of En's "multi-thickness silicide layer" are formed not by depositing metal on exposed silicon surfaces, but rather by depositing metal and/or metal silicide on the previously formed silicide regions 364.



Accordingly, the Applicants contend that the formation of this secondary “silicide” region from metal layer 382 does not constitute “form a silicide layer on the silicon surface” as recited in claim 23.

The Applicants further contend that the cited portions of Wolf relate to *reflow* processes and that nothing in the cited portions of Aloni teaches or suggests that such a *reflow* process is utilized when using BPSG to form the silicide blocking layer. Absent some such teaching or suggestion, the Applicants contend that the temperatures disclosed by Wolf as useful for *reflowing* BPSG are simply irrelevant to the teachings of Aloni. Accordingly, the assertions, Action at 6, regarding the “inherent” effect of a thermal process which is not performed cannot fairly be said to teach or suggest that any portion of the dopant, if previously activated, will be deactivated during formation of the silicide blocking layer. Indeed, as noted above, one skilled in the art following En and Aloni would not have implanted the S/D dopants before forming the silicide blocking layer and there would, therefore, be no S/D dopant, activated or not, that would be deactivated.

The Applicants, therefore, contend that the proposed combination is insufficient to maintain the present rejection under 35 U.S.C. § 103(a) and request that it be reconsidered and withdrawn accordingly.

Claims 30, 31 and 36 stand rejected under 35 U.S.C. § 103(a) as unpatentable over En in view of Aloni and further in view of Ku et al.’s U.S. Patent No. 6,329,276 (“Ku”). Action at 6. The Applicants traverse this rejection for the reasons detailed below.

The Applicants incorporate by reference the discussion above regarding the deficiencies of the proposed combination of En and Aloni for teaching the method as

recited in claim 23 from which claims 30, 31 and 36 depend. With respect to Ku, the Applicants agree that the use of capping layers in conjunction with silicidation processes was known, but contend that, in addition to the deficiencies noted above, Ku does not remedy the noted deficiencies of the primary references with respect to the underlying claim elements. Accordingly, the Applicants maintain that the proposed combination of references is not sufficient to render the invention obvious to one skilled in the art.

Further, the Applicants contend that no documentary or logic basis has been established to support the blanket assertion that “changes in the nitrogen:titanium atomic ratio produce no unexpected function,” Action at 7. Should the Examiner wish to maintain this position, the Applicants contend that something more than this broad conclusory statement is necessary and request that appropriate documentation be identified so that the Applicants are afforded a full and fair opportunity to understand and address this contention.

The Applicants, therefore, contend that the proposed combination is insufficient to maintain the present rejection under 35 U.S.C. § 103(a) and request that it be reconsidered and withdrawn accordingly.

Claims 32-35 stand rejected under 35 U.S.C. § 103(a) as unpatentable over En in view of Aloni and further in view of Cabral, Jr. et al.’s U.S. Pub. Patent Appl. No. 2004/0123922 (“Cabral”). Action at 7. The Applicants traverse this rejection for the reasons detailed below.

The Applicants incorporate by reference the discussion above regarding the deficiencies of the proposed combination of En and Aloni for teaching the method as recited in claim 23 from which claims 32-35 depend. With respect to Cabral, the Applicants note that the various alloying metals are added to the nickel to obtain certain changes in the properties of the primary metal. The Applicants note that Cabral indicates that “the temperature at which agglomeration occurs is about 550 °C.,” Cabral, page 2, paragraph [0030], and, consequently, that when the silicidation process is performed below this temperature, *e.g.*, as recited in claims 34 and 35, the stated “motivation” for using an alloying metal to suppress agglomeration disappears. The Applicants contend that one skilled in the art would not, therefore, have been motivated to prepare the recited alloy composition to suppress a behavior in the siliciding layer that would not reasonably be expected to occur.

With respect to Cabral, the Applicants agree that the use of various alloying metals in conjunction with silicidation processes was known, but contend that Cabral does not remedy the noted deficiencies of the primary references with respect to the underlying claim elements. Accordingly, the Applicants maintain that, in addition to the deficiencies noted above, the proposed combination of references is not sufficient to render the invention obvious to one skilled in the art.

The Applicants, therefore, contend that the proposed combination is insufficient to maintain the present rejection under 35 U.S.C. § 103(a) and request that it be reconsidered and withdrawn accordingly.

CONCLUSION

In view of the above remarks and amendments, the Applicants respectfully submit that each of the pending objections and rejections have been addressed and overcome, leaving the present application in condition for allowance. A notice to that effect is respectfully requested.

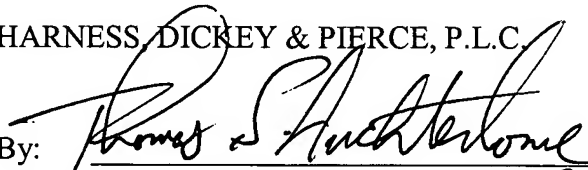
If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to contact the undersigned.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge any underpayment or non-payment of any fees required under 37 C.F.R. §§ 1.16 or 1.17, or credit any overpayment of such fees, to Deposit Account No. 08-0750, including, in particular, extension of time fees.

Respectfully submitted,

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